Department of Commerce • National Oceanic & Atmospheric Administration • National Weather Service

NATIONAL WEATHER SERVICE INSTRUCTION 10-930
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Operations and Services
Hydrologic Services Program, NWSPD 10-9

NATIONAL HYDROLOGIC PRODUCTS SPECIFICATION

NOTICE: This publication is available at: http://www.nws.noaa.gov/directives/

OPR: OS31 (F. Richards) **Certified by:** OS3 (G. Austin)
Type of Issuance: Initial

SUMMARY OF REVISIONS: This directive supersedes OML 10-01, filed with WSOM Chapter E-12, "Significant River Flood Outlook Product," dated October 30, 2001.

Signed March 13, 2003

Gregory A. Mandt Date
Director, Office of Climate,
Water, and Weather Services

National Hydrologic Products Specification

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1. Introduction. This directive describes issuance criteria, content, and format of hydrologic products that are national in scope. Products distributed over the Advanced Weather Interactive Processing System (AWIPS) follow standards for World Meteorological Organization (WMO) headings and AWIPS identifiers. Standards for all products distributed over AWIPS and NWS-supported dissemination systems are contained in NWS Instruction 10-1701, "Text Product Formats and Codes." Most AWIPS-distributed products are also available on the Internet.

2. National Hydrologic Summary (FLN). The National Hydrologic Summary is prepared by the Office of Climate, Water, and Weather Services' Hydrologic Information Center and provides a synopsis of flooding since its last issuance. The National Hydrologic Summary is based on Information disseminated by weather forecast offices (WFO).

2.1 Mission Connection. The National Hydrologic Summary helps the NWS meet its mission by providing a single source of flood information which is used by the public, government agencies and the media.

2.2 Issuance Guidelines.

2.2.1 Creation Software. Use appropriate COTS (commercial of the shelf) word processing software.

2.2.2 Issuance Time. Issue daily, Monday through Friday, and on weekends and holidays when major flooding occurs.

2.3 Technical Description.

2.3.1 MND Header. Use: "NATIONAL HYDROLOGIC SUMMARY."

2.3.2 Content. The product includes three parts: (1) a general summary of flooding, (2) an enumeration of areas where flooding occurred, and (3) specification of rivers in flood or expected to flood.

2.3.3 Format. The generic format is as follows:

```
FGUS71 KWBC ddhhmm                                    (WMO Heading)
FLNNMC                                                (AWIPS ID)

NATIONAL HYDROLOGIC SUMMARY                           (NWS Product Name)
NATIONAL WEATHER SERVICE HEADQUARTERS                 (Issuing Office)
time am/pm time_zone day mon dd yyyy                  (Issuance time/date)

FLOOD SUMMARY

<Brief narrative summary of flooding in Nation>

OUTLOOK FOR TODAY

<Narrative hydrometeorological outlook for the Nation>

FLOODING

<List of states/counties where areal flooding was reported>

RIVER FLOODING:

<List of rivers and streams with locations either above flood stage or
expected to rise above flood stage, grouped by state>

$$

<Author name>
HYDROLOGIC INFORMATION CENTER
```

2.4 Updates, Amendments and Corrections. Issue supplemental summaries during major flood events.

3. National Hydrologic Assessment. Many parts of the U.S. experience late winter and spring flooding. Snow melt and ice jams can be important contributors to this flooding in northern areas. In late winter and early spring, the Hydrologic Information Center integrates information from both WFOs and river forecast centers (RFC) and prepares a National Hydrologic Assessment which summarizes potential for such flooding.

3.1 Mission Connection. This product helps the NWS meet its mission by highlighting areas of possible flooding during the late winter and spring months, thus providing an integrated assessment which can be used by customers and partners to initiate mitigation activities at the national level.

3.2 Issuance Guidelines.

3.2.1 Creation Software. The Hydrologic Information Center uses COTS web authoring, graphics, and GIS (Geographic Information System) software.

3.2.2 Issuance Criteria. Issue on a schedule coordinated with RFCs and WFOs to ensure that both local and national requirements can be met with minimum duplication of effort.

3.2.3 Issuance Time. Issue on a bi-weekly basis, from late January through March. If conditions warrant, issue updates more frequently and/or extend the issuance period.

3.3 Technical Description.

3.3.1 Dissemination. The National Hydrologic Assessment is provided exclusively on the Internet.

3.3.2 Content. RFCs issue Extended-Range Streamflow Prediction Products (see NWS Instruction 10-912) that serve as guidance for Hydrologic Outlooks issued by WFOs (See NWS Instruction 10-922). The Hydrologic Information Center uses these products as the basis for the National Hydrologic Assessment.

The main web page includes a map summarizing hydrologic conditions and a text summary. It also includes links to products provided by WFOs and RFCs, as well as to information on factors that affect the assessment (e.g., snow cover, soil moisture, stream flow conditions, etc.)

3.3.3 Format. The Assessment is web-based with a main page and links to supporting web pages.

3.4 Updates, Amendments and Corrections. Update the main web page according to a schedule coordinated annually with the NWS regions and the Climate Prediction Center. Post updates issued by individual WFOs and RFCs as they become available.

4. National Significant River Flood Outlook. This graphical product broadly identifies areas where potential exists for significant river flooding over a 5-day period. The term "significant flooding" includes flooding which falls in the moderate and major categories as defined in NWS Instruction 10-950. The product is prepared by the National Centers for Environmental Prediction (NCEP) Hydrometeorological Prediction Center and is a mosaic of individual graphical outlooks from the CONUS (COtermiNous United States) RFCs (see NWS Instruction 10-912).

4.1 Mission Connection. This information helps the NWS to meet its mission by graphically depicting areas of river flood potential over the entire Nation. This helps customers and partners focus and optimize their flood mitigation activities, thus protecting lives and property and enhancing the national economy.

4.2 Issuance Guidelines.

4.2.1 Creation Software. Use N-AWIPS (National Centers-AWIPS) software or other applications as appropriate.

4.2.2 Issuance Criteria. Issue the outlook daily.

4.2.3 Issuance Time. Issue the outlook at approximately 4 p.m., Eastern Time.

4.2.4 Valid Time. The product is valid until updated.

4.3 Technical Description.

4.3.1 Dissemination. Issue products on AWIPS using an AWIPS ID (identifier) of **GPHWNH** and WMO Header of **PENJ88 KWNH**. Each RFC web page provides a link to the National Significant River Flood Outlook product.

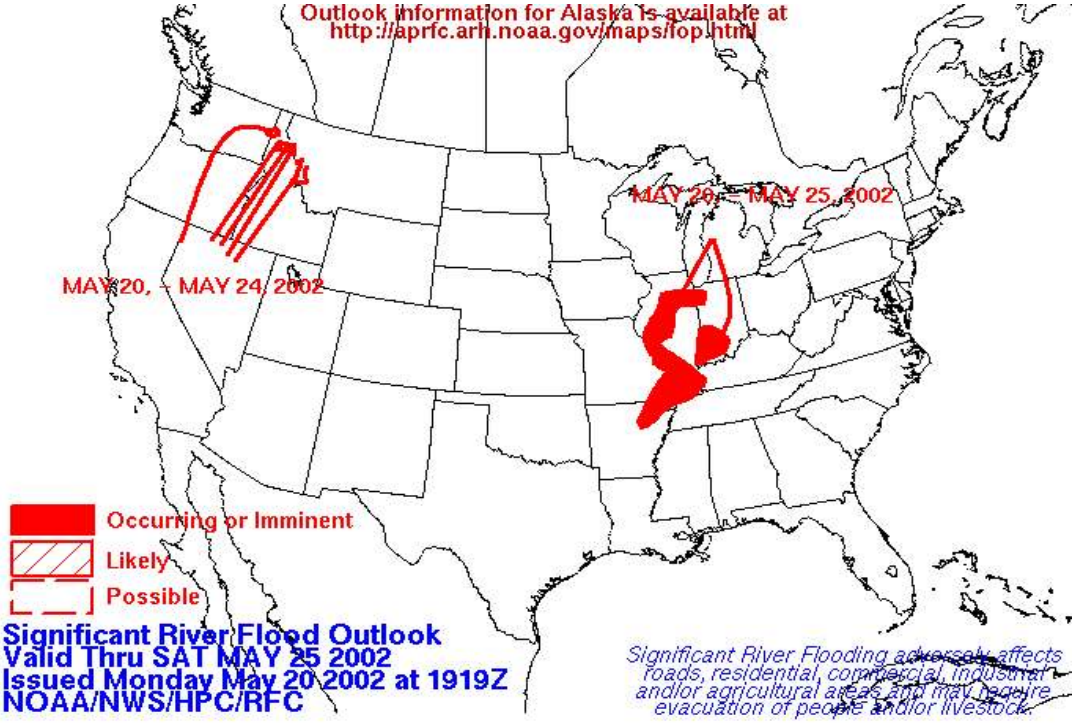
4.3.2. Content. Using the color/patterns used in the sample product shown in section 4.3.3, characterize flood potential according to the following criteria:

a. Possible: Hydrometeorological conditions indicate that significant flooding could occur. Such flooding is neither certain nor imminent.

b. Likely: Hydrometeorological conditions indicate that significant flooding can be expected during the outlook period.

c. Occurring/Imminent: Significant flooding is already occurring or is forecast to occur during the outlook period.

4.3.3 Format. A sample significant river flood potential outlook product is shown below:



5. Hydrometeorological Automated Data System Report (RRS). These products provide hydrometeorological observations in near real time to support NWS operations. These products are generated by the Hydrometeorological Automated Data System (HADS).

5.1 Mission Connection. HADS Reports support the NWS mission by providing critical automated sensor data which is used in RFC operations, WFO hydrologic operations, fire weather operations, and other NWS operations which require near real-time hydrometeorological data.

5.2 Issuance Guidelines.

5.2.1 Creation Software. Custom software decodes telemetered data, stores it, provides for quality control, and encodes data in Standard Hydrometeorological Exchange Format (SHEF).

5.2.2 Issuance Time. Issue multiple times each day upon receipt of data.

5.3 Technical Description.

5.3.1 Dissemination. The headers used in the RRS product to support each individual WFO and RFC are contained in appendix A. WFO headers are also available on the Internet at: http://www.nws.noaa.gov/oh/hads/new_wmo_headers.html.

5.3.2 Content. Messages contain automated river, precipitation and temperature observations.

5.3.3 Format. Encode messages in SHEF. The generic format is as follows:

```
SXUS37 KWOH ddhhmm                                    (WMO Heading)
^NMCRRSxxx                    (AWIPS ID, special format approved for HADS)

:
: && HADS SOR-xxx
<One or more lines of SHEF-encoded data>
```

6. Daily SNOTEL Report (RSD). The Natural Resources Conservation Service's (NRCS) SNOwpack TELemetry (SNOTEL) network provides automated snow water equivalent, precipitation, temperature, and other hydrometeorological data from high elevation areas of the western U.S. and Alaska. As per a cooperative agreement, SNOTEL data are collected, processed, and inserted into RSD products by the NRCS and transferred to the NWS for dissemination.

6.1 Mission Connection. SNOTEL data are obtained from high elevation areas of the western U.S. and Alaska and are used by WFOs and RFCs to monitor snow pack conditions in support of the NWS hydrology program.

6.2 Issuance Guidelines.

6.2.1 Creation Software. These products are created by the NRCS using appropriate software.

6.2.2 Issuance Time. The NRCS produces messages on both a daily and hourly basis. The NWS transmits messages as received.

6.3 Technical Description.

6.3.1 Dissemination. Table 6.1 identifies various headers used to provide data in the western U.S. and Alaska.

Table 6.1. RSD product headers, by state.

State	WMO Header	AWIPS Header
Alaska	CXUS86 KSCS	RSD AK
Arizona	CXUS86 KSCS	RSD AZ
California	CXUS86 KSCS	RSD CA
Colorado	CXUS86 KSCS	RSD CO
Idaho	CXUS86 KSCS	RSD ID
Montana	CXUS86 KSCS	RSD MT
Nevada	CXUS86 KSCS	RSD NV
New Mexico	CXUS86 KSCS	RSD NM
Oregon	CXUS86 KSCS	RSD OR
South Dakota	CXUS86 KSCS	RSD SD
Utah	CXUS86 KSCS	RSD UT
Washington	CXUS86 KSCS	RSD WA
Wyoming	CXUS86 KSCS	RSD WY

6.3.2 Content. The product contains precipitation, snow, and temperature observations.

6.3.3. Format. Encode messages in SHEF, as done in the sample Daily SNOTEL Report shown below.

```
ZCZC NMCRRMxx
SRUW24 KSCS ddhhmm
 <.B format header>
:  U.S. DEPT. OF AGRICULTURE - Natural Resources Conservation Service.
:  PROVISIONAL DATA, SUBJECT TO REVISION.
:
 <SHEF-encoded SNOTEL data>
:
: <Comments if required>
.END
```

7. Monthly SNOTEL Report (RSM). Monthly SNOTEL Reports contain summaries of SNOTEL network observations which have been quality controlled by the NRCS. The monthly summaries are prepared by the NRCS and transferred to the NWS for dissemination.

7.1 Mission Connection. Monthly SNOTEL Reports help the NWS meet its mission by providing data summaries which can be used in forecasting water supply and snow melt runoff.

7.2 Issuance Guidelines.

7.2.1 Creation Software. These products are created by the NRCS using appropriate software.

7.2.2 Issuance Time. Products are issued early in the month and in the middle of the month from January through May or June, depending on the duration of the snow melt season. NWS transmits messages when received.

7.3 Technical Description.

7.3.1 Dissemination. Table 7.1 identifies various headers used to provide data in the western U.S. and Alaska.

Table 7.1. RSM product headers, by state.

State	WMO Header	AWIPS Header
Alaska	CSUS86 KSCS	RSM AK
Arizona	CSUS86 KSCS	RSM AZ
California	CSUS86 KSCS	RSM CA
Colorado	CSUS86 KSCS	RSM CO
Idaho	CSUS86 KSCS	RSM ID
Montana	CSUS86 KSCS	RSM MT
Nevada	CSUS86 KSCS	RSM NV
New Mexico	CSUS86 KSCS	RSM NM
Oregon	CSUS86 KSCS	RSM OR
South Dakota	CSUS86 KSCS	RSM SD
Utah	CSUS86 KSCS	RSM UT
Washington	CSUS86 KSCS	RSM WA
Wyoming	CSUS86 KSCS	RSM WY

7.3.2 Content. The messages contain precipitation and snow totals, as well as temperature averages.

7.3.3 Format. Encode messages in SHEF. The generic format is as follows:

```
CSUS86 KSCS ddhhmm                                          (WMO Heading)
RSMxx                                                       (AWIPS ID)

 <.B Format header>
: U.S. DEPT. OF AGRICULTURE - Natural Resources Conservation Service
: PROVISIONAL DATA, MONTHLY CORRECTED SNOTEL PRECIPITATION ACCUMULATION
: DATA
 <SHEF-encoded data>
.END
```

8. Airborne Survey Gamma Product (RRM). These products are prepared by the National Operational Hydrologic Remote Sensing Center (NOHRSC). They contain snow water equivalent (SWE) data collected from aircraft during the January through April period. Products may also include remotely-sensed soil moisture information.

8.1 Mission Connection. These products help the NWS meet its mission by providing data over areas which may have little or no ground-based sensors measuring snow water equivalent. Data from these products allow snow accumulation and melt to be accounted for in river and flood forecasts, water supply forecasts, and spring flood outlooks issued for areas affected by snow.

8.2 Issuance Guidelines.

8.2.1 Creation Software. Use customized software known as the Operational Product Processing System (OPPS) to create products.

8.2.2 Issuance Criteria. Issue when airborne data are processed and ready for distribution.

8.2.3 Issuance Time. Schedule times and areas for airborne surveys and subsequent product issuances based on based on national snow cover conditions and operational requirements of field offices. One consideration is the schedule for issuance of WFO spring snowmelt flood outlook products.

8.3 Technical Description.

8.3.1 Dissemination. Issue products over AWIPS based on Table 8.1 and post products to the NOHRSC web page.

Table 8.1. RRM product headers.

AWIPS ID	WMO Header	Description
MSPRRMASB	SRUS43 KMSR	Airborne Soil Moisture by Basin
MSPRRMASF	SRUS43 KMSR	Airborne Soil Moisture by Flight Line
MSPRRMASP	SRUS43 KMSR	Airborne SWE by Flight Line
MSPRRMASW	SRUS43 KMSR	Airborne Estimated SWE by Basin

8.3.2 Content. Messages contain SWE and/or soil moisture information encoded in SHEF. Explanatory notes may also be included.

8.3.3 Format. Encode messages in SHEF, as done in the sample NOHRSC Airborne Survey Gamma Product shown below (for flight lines in southwestern Minnesota and northern Iowa).

```
SRUS43 KMSR ddhhmm                                              (WMO Heading)
RRMxxx                                                          (AWIPS ID)
 <.B Format header>
:TO ------ Service Hydrologist (Please give HARDCOPY to SH)
:FROM ---- Tom Carroll, (952) 361-6610 ext 225, Minneapolis, Minnesota
:Visit our web page at www.nohrsc.nws.gov
:SUBJECT - AIRBORNE SWE DATA 010218210638
:-------------------------------------------------------------------
: Total No. of flight lines sent = #
:-------------------------------------------------------------------
:Line Survey %SC SWE SWE %SM Est Fall %SM Pilot
:No. Date (in) (35%) (M) Typ Date (F) Remarks
:===================================================================
 <One or more lines of SHEF-encoded flight line data>
.END
<Narrative summary, if required>
```

9. Satellite Areal Extent of Snow Cover Product (SCV). These products are prepared by the NOHRSC and contain satellite-based estimates of snow cover in the U.S. and adjacent portions of Canada.

9.1 Mission Connection. These products help the NWS meet its mission by providing spatial snow cover information for areas which may have little or no other observation sources. This information is used by WFOs and RFCs when analyzing hydrologic conditions and preparing water supply forecasts, and spring flood outlooks for snow-affected areas.

9.2 Issuance Guidelines.

9.2.1 Creation Software. Use the NOHRSC OPPS software to generate this product.

9.2.2 Issuance Criteria. Issue products daily when there is significant snow cover.

9.2.3 Issuance Time. Issue products at approximately 1500 UTC.

9.3 Technical Description.

9.3.1 Dissemination. Issue products over AWIPS based on Table 9.1 and post products on the NOHRSC web page.

Table 9.1. SCV product headers.

AWIPS ID	WMO Header	Description
MSPSCVACR	SRUS43 KMSR	Estimated SCV by Basin for APRFC
MSPSCVALR	SRUS43 KMSR	Estimated SCV by Basin for SERFC
MSPSCVFWR	SRUS43 KMSR	Estimated SCV by Basin for WGRFC
MSPSCVKRF	SRUS43 KMSR	Estimated SCV by Basin for MBRFC
MSPSCVMSR	SRUS43 KMSR	Estimated SCV by Basin for NCRFC
MSPSCVORN	SRUS43 KMSR	Estimated SCV by Basin for LMRFC
MSPSCVPTR	SRUS43 KMSR	Estimated SCV by Basin for NWRFC
MSPSCVRHA	SRUS43 KMSR	Estimated SCV by Basin for MARFC
MSPSCVRSA	SRUS43 KMSR	Estimated SCV by Basin for CNRFC
MSPSCVSTR	SRUS43 KMSR	Estimated SCV by Basin for CBRFC
MSPSCVTAR	SRUS43 KMSR	Estimated SCV by Basin for NERFC
MSPSCVTIR	SRUS43 KMSR	Estimated SCV by Basin for OHRFC
MSPSCVTUA	SRUS43 KMSR	Estimated SCV by Basin for ABRFC

9.3.2 Content. Messages contain SWE and/or soil moisture information encoded in SHEF. Explanatory notes may also be included.

9.3.3 Format. Encode messages in SHEF. The generic format is as follows:

```
SRUS43 KMSR ddhhmm                                              (WMO Heading)
SCVxxx                                                          (AWIPS ID)

 <.B Format Header>
:-------------------------------------------------------------------------
:NATIONAL WEATHER SERVICE - OFFICE OF CLIMATE, WATER, AND WEATHER SERVICES
:NATIONAL OPERATIONAL HYDROLOGIC REMOTE SENSING CENTER
:CHANHASSEN MINNESOTA                  (952) 361-6610
:-------------------------------------------------------------------------
:SATELLITE AREAL EXTENT OF SNOW COVER (PERCENT) BY ELEVATION ZONES (1000FT)
:COMPOSITE ANALYSIS yymmddhh_start - yymmddhh_end
:
:BASIN      SA   NAME
:                          EZONE1  EZONE2  EZONE3  EZONE4  EZONE5  EZONE6

 <One or more lines of SHEF-encoded data>
.END
NNNN
```

10. Estimated Snow Water Equivalent by Basin Product (SWE). These products are prepared by the NOHRSC from January through April. They contain estimated snow water equivalent (SWE) amounts based on an integration of data assembled over the previous 24-hour period.

10.1 Mission Connection. These products help the NWS meet its mission by providing snow water equivalent data for individual stream basins. This allows snow accumulation and melt to be accounted for in river and flood forecasts, water supply forecasts, and spring flood outlooks issued for all basins affected by snow.

10.2 Issuance Guidelines.

10.2.1 Creation Software. Use the NOHRSC OPPS software to generate this product.

10.2.2 Issuance Criteria. Issue products for each RFC where snow is present.

10.2.3 Issuance Time. Issue products at approximately 1500 UTC.

10.3 Technical Description.

10.3.1 Dissemination. Issue products over AWIPS based on Table 10.1 and post products to the NOHRSC web page.

Table 10.1 SWE product headers.

AWIPS ID	WMO Header	Description
MSPSWEACR	SRUS43 KMSR	Estimated SWE by Basin for APRFC
MSPSWEALR	SRUS43 KMSR	Estimated SWE by Basin for SERFC
MSPSWEFWR	SRUS43 KMSR	Estimated SWE by Basin for WGRFC
MSPSWEKRF	SRUS43 KMSR	Estimated SWE by Basin for MBRFC
MSPSWEMSR	SRUS43 KMSR	Estimated SWE by Basin for NCRFC
MSPSWEORN	SRUS43 KMSR	Estimated SWE by Basin for LMRFC
MSPSWEPTR	SRUS43 KMSR	Estimated SWE by Basin for NWRFC
MSPSWERHA	SRUS43 KMSR	Estimated SWE by Basin for MARFC
MSPSWERSA	SRUS43 KMSR	Estimated SWE by Basin for CNRFC
MSPSWESTR	SRUS43 KMSR	Estimated SWE by Basin for CBRFC
MSPSWETAR	SRUS43 KMSR	Estimated SWE by Basin for NERFC
MSPSWETIR	SRUS43 KMSR	Estimated SWE by Basin for OHRFC
MSPSWETUA	SRUS43 KMSR	Estimated SWE by Basin for ABRFC

10.3.2 Content. Messages contain SWE and/or soil moisture information encoded in SHEF. Explanatory notes may also be included.

10.3.3 Format. Encode messages in SHEF. The generic format is as follows:

```
SRUS43 KMSR ddmmhh                                              (WMO Heading)
SWExxx                                                          (AWIPS ID)

 <.B Format Header>
:--------------------------------------------------------------------------
:NATIONAL WEATHER SERVICE - OFFICE OF CLIMATE, WATER, AND WEATHER SERVICES
:NATIONAL OPERATIONAL HYDROLOGIC REMOTE SENSING CENTER
:CHANHASSEN MINNESOTA                  (952) 361-6610
:--------------------------------------------------------------------------
:ESTIMATED AIRBORNE SNOW WATER EQUIVALENT (INCHES) BY BASIN BY ELEVATION
ZONES (1000FT)
:ANALYSIS yymmddhh
:
:BASIN      SW   NAME
:                       EZONE1  EZONE2  EZONE3  EZONE4  EZONE5  EZONE6
 <One or more lines of SHEF-encoded data>
.END
NNNN
```

11. Rainfall Potential For Exceeding Flash Flood Guidance (94E). This product is prepared by NCEP's Hydrometeorological Prediction Center (HPC) for the CONUS. The product identifies where rainfall is expected to exceed RFC flash flood guidance criteria.

11.1 Mission Connection. This product helps the NWS to meet its mission by providing NWS field offices with graphical information showing the areas with the greatest likelihood of flash flooding.

11.2 Issuance Guidelines.

11.2.1 Creation Software. Use N-AWIPS software or other applications as appropriate.

11.2.2 Issuance Criteria. Issue the product routinely.

11.2.3 Issuance Time. These products are issued as indicated in Table 11.1.

11.2.4 Valid Time. See Table 11.1.

11.3 Technical Description.

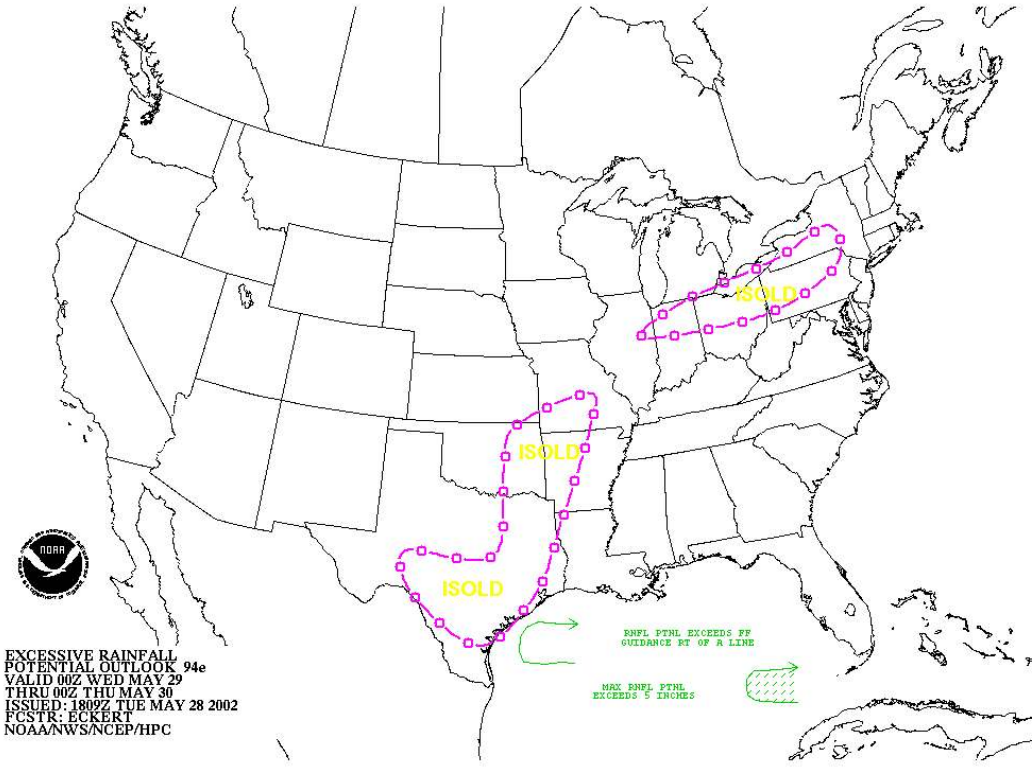
11.3.1 Dissemination. Issue the product on AWIPS based on Table 11.1.

Table 11.1. Issuance time, valid time, product ID, and content of flash flood guidance products.

HPC CONUS Graphical Flash Flood Guidance Product Schedule				
Issuance Time (UTC)	**Valid Time (UTC)**	**AWIPS ID**	**WMO Header**	**Product Description**
0215	0300 - 1200	RBG94E	PEI745 KWBC	Rainfall Potential Exceeding Flash Flood Guidance Values and/or 5“ during the forecast valid time
0615	1200 - 1200	RBG94E	PEI745 KWBC	Rainfall Potential Exceeding Flash Flood Guidance Values and/or 5“ during the forecast valid time
1415	1500 - 1200	RBG94E	PEI745 KWBC	Rainfall Potential Exceeding Flash Flood Guidance Values and/or 5“ during the forecast valid time
1815	0000 - 0000	RBG94E	PEI745 KWBC	Rainfall Potential Exceeding Flash Flood Guidance Values and/or 5“ during the forecast valid time

11.3.2 Content. The product depicts areas that are expected to approach or exceed flash flood guidance and/or exceed 5 inches of rainfall during the valid period of the product.

11.3.3 Format. A sample Rainfall Potential For Exceeding Flash Flood Guidance product is shown below. The product shows areas expected to exceed RFC flash flood guidance values or exceed 5 inches of rainfall during the valid period.



11.4 Updates, Amendments and Corrections. Update this product if meteorological conditions change or if corrections are needed.

12. Excessive Rainfall Discussion (ERD). This product is prepared by the HPC for the CONUS. The product provides explanation and interpretation of the Rainfall Potential For Exceeding Flash Flood Guidance graphic (see Section 11 above).

12.1 Mission Connection. This product helps the NWS to meet its mission by providing NWS field offices with information highlighting the areas with the greatest likelihood of flash flooding.

12.2 Issuance Guidelines.

12.2.1 Creation Software. Use appropriate COTS word processing software.

12.2.2 Issuance Criteria. Issue the product routinely.

12.2.3 Issuance Time. 0300, 0700, 1500, and 1900 UTC

12.2.4 Valid Time. 0300 -1200 UTC , 1200-1200 UTC , 1500-1200, and 0000-0000 UTC.

12.2.5 Product Expiration Time. Product expires at the end of the valid time.

12.3 Technical Description.

12.3.1 MND Header. Use "EXCESSIVE RAINFALL DISCUSSION."

12.3.2 Content. A text message providing an explanation and interpretation of the Rainfall Potential For Exceeding Flash Flood Guidance graphic.

12.3.3 Format. The generic format is as follows:

```
FOUS30 KWBC ddhhmm                                          (WMO Heading)
QPFERD                                                      (AWIPS ID)

EXCESSIVE RAINFALL DISCUSSION                               (NWS Product Name)
NWS HYDROMETEOROLOGICAL PREDICTION CENTER CAMP SPRINGS MD   (Issuing Office)
time am/pm time_zone day mon dd yyyy                        (Issuance time/date)

...VALID hhZ day mon dd yyyy - hhZ day mon dd yyyy
...REFERENCE AWIPS GRAPHIC UNDER...DAY 1 EXCESSIVE RAINFALL

 <discussion text>

<forecaster name>

GRAPHICS AVAILABLE ON THE WEB AT www.hpc.ncep.noaa.gov

$$
```

12.4 Updates, Amendments and Corrections. Update under rapidly changing meteorological conditions. Correct for format and grammatical errors as required.

13. 6-Hour Quantitative Precipitation Forecasts (Day 1-3). These products, prepared by the HPC, delineate quantitative precipitation forecast (QPF) amounts for specified 6-hour periods. The products are available in both graphical and gridded format.

13.1 Mission Connection. RFCs use QPF as input to models used in the hydrologic forecast process. WFOs use QPF to support their river and flash flood warning programs. Graphical QPF products and their gridded versions are posted on the Internet for use by partners and the general public.

13.2 Issuance Guidelines.

13.2.1 Creation Software. Use N-AWIPS software or other applications as appropriate to generate these products.

13.2.2 Issuance Criteria. Issue the product routinely.

13.2.3 Issuance Time. Issue products as indicated in Table 13.1.

13.2.4 Valid Time. See Table 13.1.

13.3 Technical Description.

13.3.1 Dissemination. Issue the product on AWIPS based on Table 13.1. Also post products on the Internet for general public use.

Table 13.1. Issuance time, valid time, product ID, and content of 6-hour QPF products.

HPC CONUS 6-hr QPF Product Schedule						
Issuance Time (UTC)	**Valid Time (UTC)**	**Graphical**		**Gridded**		**Product Description**
		AWIPS ID	**WMO Header**	**AWIPS ID**	**WMO Header**	
0600	0600 - 1200	RBG91E	PEIB40 KWNO	QPF91E	ZEXB98 KWNH	0 - 6 h liquid equivalent QPF
0615	1200 - 1800	RBG92E	PEIC43 KWBC	QPF92E	ZEXC98 KWNH	Preliminary 6-12 h QPF
	1800 - 0000	RBG93E	PEID44 KWBC	QPF93E	ZEXD98 KWNH	Preliminary 12-18 h QPF
	0000 - 0600	RBG9EE	PEIE40 KWNO	QPF9EE	ZEXE98 KWNH	Preliminary 18-24 h QPF
	0600 - 1200	RBG9FE	PEIF40 KWNO	QPF9FE	ZEXF98 KWNH	Preliminary 24-30 h QPF
0700	1200 - 1800	RBG9GE	PEII42 KWBC	QPF9GE	ZEXG98 KWNH	Preliminary 29 - 35 h QPF
	1800 - 0000	RBG9HE	PEBF98 KWNH	QPF9HE	ZEXH98 KWNH	Preliminary 35 - 41 h QPF
	0000 - 0600	RBG9IE	PEBG98 KWNH	QPF9IE	ZEXI98 KWNH	Preliminary 41 - 47 h QPF
	0600 - 1200	RBG9JE	PEBH98 KWNH	QPF9JE	ZEXJ98 KWNH	Preliminary 47 - 53 h QPF
1015	1200 - 1800	RBG92E	PEIC43 KWBC	QPF92E	ZEXC98 KWNH	Final 2 - 8 h QPF
	1800 - 0000	RBG93E	PEID44 KWBC	QPF93E	ZEXD98 KWNH	Final 8 - 14 h QPF
	0000 - 0600	RBG9EE	PEIE40 KWNO	QPF9EE	ZEXE98 KWNH	Final 14 - 20 h QPF
	0600 - 1200	RBG9FE	PEIF40 KWNO	QPF9FE	ZEXF98 KWNH	Final 20 - 26 h QPF
	1200 - 1800	RBG9GE	PEBF98 KWNH	QPF9GE	ZEXG98 KWNH	Final 26 - 32 h QPF
	1800 - 0000	RBG9HE	PEBG98 KWNH	QPF9HE	ZEXH98 KWNH	Final 32 - 38 h QPF
	0000 - 0600	RBG9IE	PEBH98 KWNH	QPF9IE	ZEXI98 KWNH	Final 38 - 44 h QPF
	0600 - 1200	RBG9JE	PEBI88 KWNH	QPF9JE	ZEXJ98 KWNH	Final 44 - 50 h QPF
	1200 - 1800	RBG9KE	PEBI98 KWNH	QPF9KE	ZEXK98 KWNH	50 - 56 h QPF**
	1800 - 0000	RBG9LE	PEBJ88 KWNH	QPF9LE	ZEXL98 KWNH	56 - 62 h QPF**
	0000 - 0600	RBG9OE	PEBJ98 KWNH	QPF9OE	ZEXM98 KWNH	62 - 68 h QPF**
	0600 - 1200	RBG9NE	PEBK98 KWNH	QPF9NE	ZEXN98 KWNH	68 - 74 h QPF**

Table 13.1 (continued)**.** Issuance time, valid time, product ID, and content of 6-hour QPF products.

HPC CONUS 6-h QPF Product Schedule - Continued						
Issuance Time (UTC)	**Valid Time (UTC)**	**Graphical**		**Gridded**		**Product Description**
		AWIPS ID	**WMO Header**	**AWIPS ID**	**WMO Header**	
1800	1800 - 0000	RBG91E	PEIB40 KWNO	QPF91E	ZEXB98 KWNH	0 - 6 h liquid equivalent QPF
1815	0000 - 0000	RBG94Q	PEIE41 KWBC	--------	----------	Preliminary 6-30 h (Day 1) QPF
	0000 - 0600	RBG92E	PEIC43 KWBC	QPF92E	ZEXC98 KWNH	Preliminary 6-12 h QPF
	0600 - 1200	RBG93E	PEID44 KWBC	QPF93E	ZEXD98 KWNH	Preliminary 12-18 h QPF
	1200 - 1800	RBG9EE	PEIE40 KWNO	QPF9EE	ZEXE98 KWNH	Preliminary 18-24 h QPF
	1800 - 0000	RBG9FE	PEIF40 KWNO	QPF9FE	ZEXF98 KWNH	Preliminary 24-30 h QPF
1900	0000 - 0600	RBG9GE	PEBF98 KWNH	QPF9GE	ZEXG98 KWNH	Preliminary 29 - 35 h QPF
	0600 - 1200	RBG9HE	PEBG98 KWNH	QPF9HE	ZEXH98 KWNH	Preliminary 35 - 41 h QPF
	1200 - 1800	RBG9IE	PEBH98 KWNH	QPF9IE	ZEXI98 KWNH	Preliminary 41 - 47 h QPF
	1800 - 0000	RBG9JE	PEBI88 KWNH	QPF9JE	ZEXJ98 KWNH	Preliminary 47 - 53 h QPF
2215	0000 - 0600	RBG92E	PEIC43 KWBC	QPF92E	ZEXC98 KWNH	Final 2 - 8 h QPF
	0600 - 1200	RBG93E	PEID44 KWBC	QPF93E	ZEXD98 KWNH	Final 8 - 14 h QPF
	1200 - 1800	RBG9EE	PEIE40 KWNO	QPF9EE	ZEXE98 KWNH	Final 14 - 20 h QPF
	1800 - 0000	RBG9FE	PEIF40 KWNO	QPF9FE	ZEXF98 KWNH	Final 20 - 26 h QPF
	0000 - 0600	RBG9GE	PEBF98 KWNH	QPF9GE	ZEXG98 KWNH	Final 26 - 32 h QPF
	0600 - 1200	RBG9HE	PEBG98 KWNH	QPF9HE	ZEXH98 KWNH	Final 32 - 38 h QPF
	1200 - 1800	RBG9IE	PEBH98 KWNH	QPF9IE	ZEXI98 KWNH	Final 38 - 44 h QPF
	1800 - 0000	RBG9JE	PEBI88 KWNH	QPF9JE	ZEXJ98 KWNH	Final 44 - 50 h QPF
	0000 - 0600	RBG9KE	PEBI98 KWNH	QPF9KE	ZEXK98 KWNH	50 - 56 h QPF**
	0600 - 1200	RBG9LE	PEBJ88 KWNH	QPF9LE	ZEXL98 KWNH	56 - 62 h QPF**
	1200 - 1800	RBG9OE	PEBJ98 KWNH	QPF9OE	ZEXM98 KWNH	62 - 68 h QPF**
	1800 - 0000	RBG9NE	PEBK98 KWNH	QPF9NE	ZEXN98 KWNH	68 - 74 h QPF**

Notes
* *Winter Issuance Only*
** *Only Oct 15 - Apr 15*

13.3.2 Content. Products represent 6-hr isohyets depicting 0.01, 0.25, 0.50, 1.0, 2.0, etc., -inch amounts over the conterminous United States.

13.3.3 Format. Produce graphical products following the formats shown in Figures 13.1 and 13.2 (the latter is based on the gridded QPFs). Produce gridded products using the International GRIB (GRIdded Binary) format.

Figure 13.1. HPC 6-hr QPF graphic showing expected precipitation using predefined isohyets.

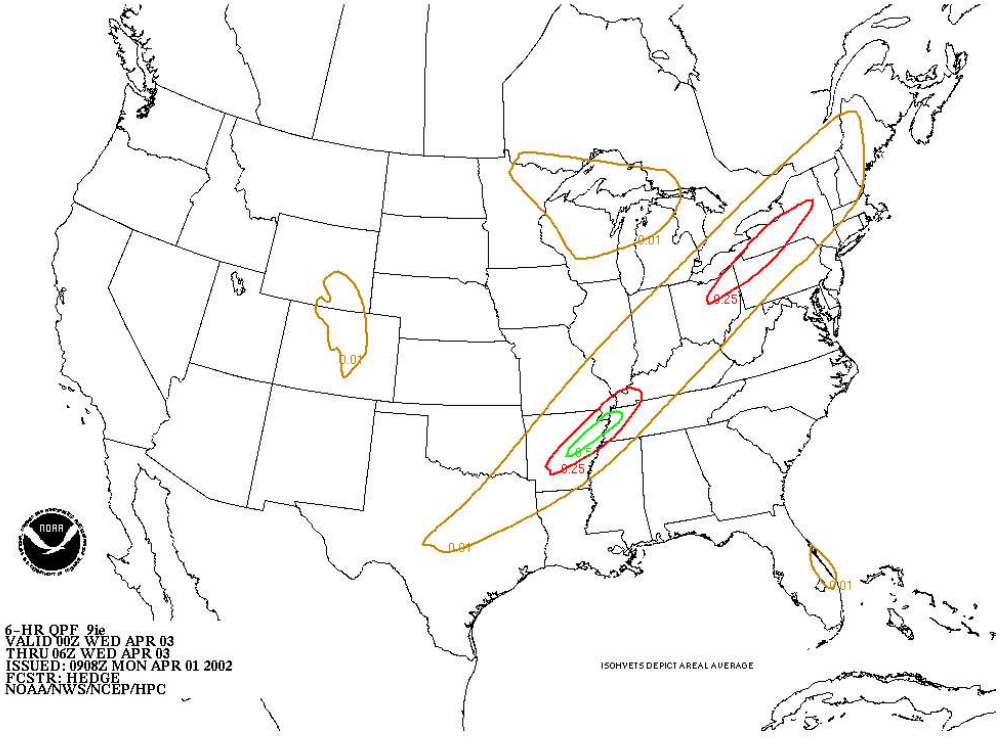
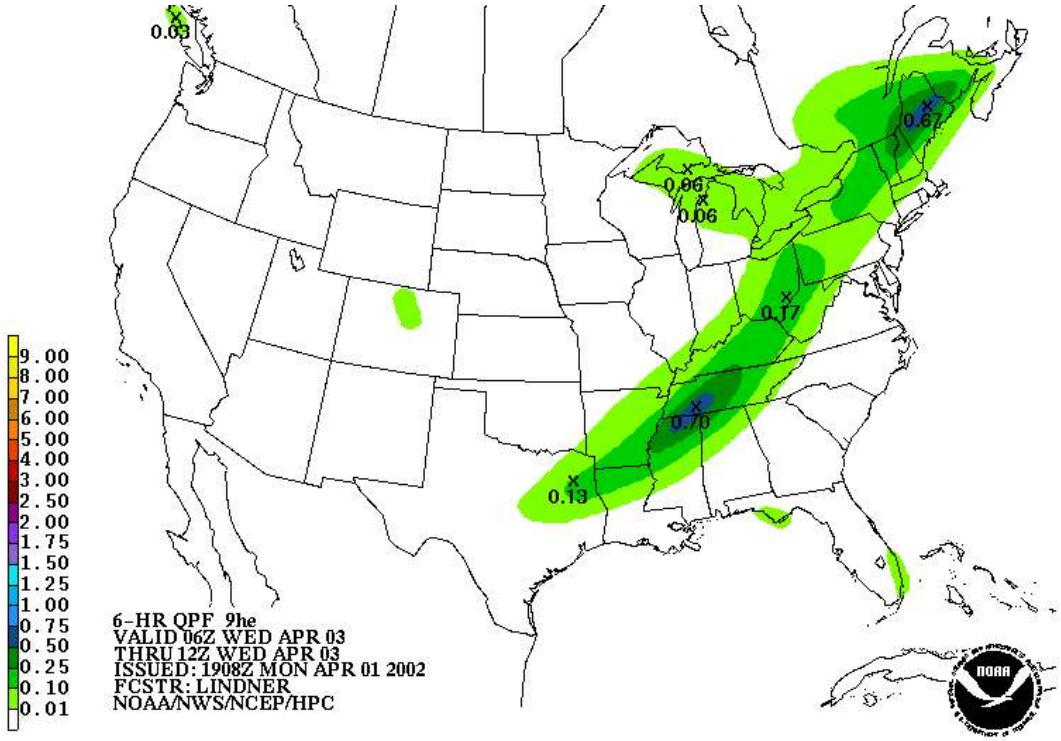


Figure 13.2. HPC 6-hr QPF graphic showing expected precipitation, based on gridded data.



13.4 Updates, Amendments and Corrections. Update if requested by an RFC. Issue corrections if necessary.

14. 24-Hour Quantitative Precipitation Forecast (Day 1 - 3). These products, prepared by the HPC, delineate QPF amounts for specified 24-hour periods.

14.1 Mission Connection. These products help the NWS to meet its mission by providing RFCs with forecast precipitation information used in the river modeling and forecasting process. The product also supports WFO public weather programs.

14.2 Issuance Guidelines.

14.2.1 Creation Software. Use N-AWIPS software to generate these products.

14.2.2 Issuance Criteria. Issue the product routinely.

14.2.3 Issuance Time. Issue these products as shown in Table 14.1.

14.2.4 Valid Time. The valid times for these products are shown Table 14.1.

14.3 Technical Description. Products should follow the format and content described in this section.

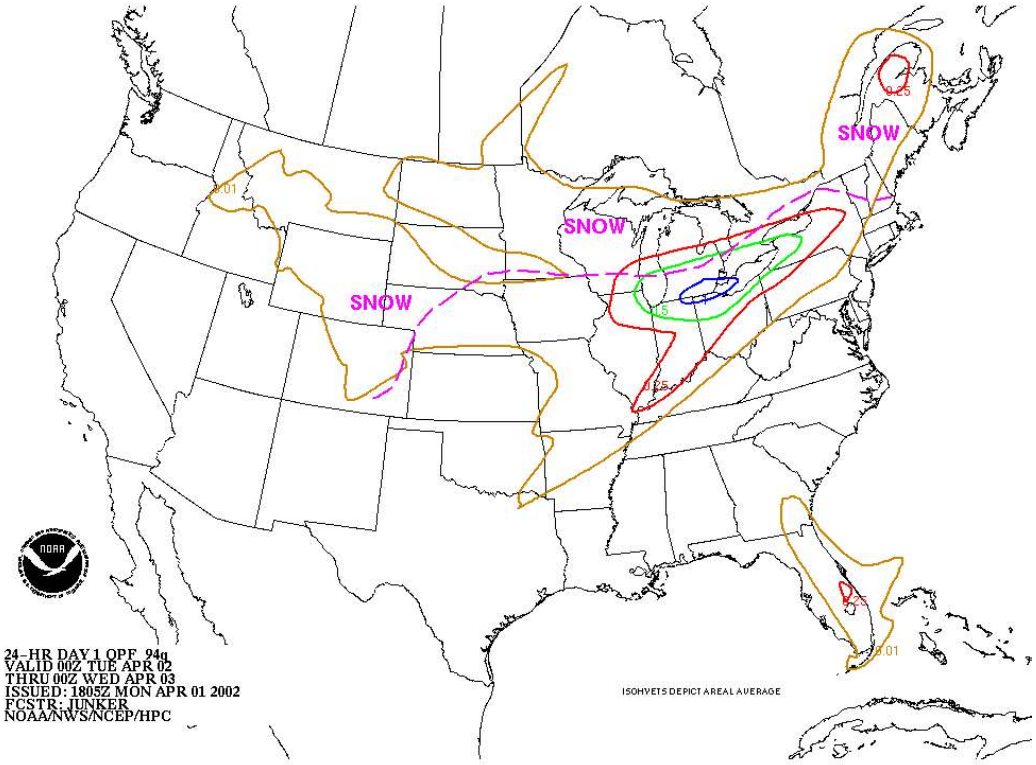
14.3.1 Dissemination. Disseminate on AWIPS according to Table 14.1. Also post products on the Internet for general public use.

Table 14.1. Issuance time, valid time, product ID, and content of 24-hour QPF products.

HPC CONUS 24-h QPF Product Schedule				
Issuance Time (UTC)	**Valid Time (UTC)**	**AWIPS ID**	**WMO Header**	**Product Description**
0615	1200 - 1200	RBG94Q	PEIE41 KWBC	Preliminary 6 - 30 h (Day 1) QPF
0700	1200 - 1200	RBG98Q	PEII42 KWBC	Preliminary 29 - 53 h (Day 2) QPF
1015	1200 - 1200	94Q	PEIE41 KWBC	Final 2 - 26 h (Day 1) QPF
	1200 - 1200	98Q	PEII42 KWBC	Final 26 - 50 h (Day 2) QPF
	1200 - 1200	99Q	PEIK98 KWNH	50 - 74 h (Day 3) QPF
1815	0000 - 0000	94Q	PEIE41 KWBC	Preliminary 6 - 30 h (Day 1) QPF
1900	0000 - 0000	98Q	PEII42 KWBC	Preliminary 29 - 53 h (Day 2) QPF
2215	0000 - 0000	94Q	PEIE41 KWBC	Final 2 - 26 h (Day 1) QPF
	0000 - 0000	98Q	PEII42 KWBC	Final 26 - 50 h (Day 2) QPF
	0000 - 0000	99Q	PEIK98 KWNH	50 - 74 h (Day 3) QPF

14.3.2 Content. These products represent 24-hr isohyets depicting 0.01 , 0.25, 0.50, 1.0, 2.0, etc., -inch QPF amounts over the United States. The products also show the rain-snow line or areas of predominately snow, as appropriate for the season.

14.3.3 Format. Follow the format used in the sample below – a 24-hr QPF graphic with expected precipitation shown using predefined isohyets.



14.4 Update, Amendments and Corrections. Update this product if requested by an RFC. Issue corrections as needed.

15. Quantitative Precipitation Forecast Discussion (PFD). This product, prepared by the HPC, provides a discussion supporting QPF for day 1, 2, and 3 (94Q, 98Q, 99Q).

15.1 Mission Connection. This product helps the NWS meet its mission by maximizing forecaster understanding of QPF products, thus ensuring production of the best possible hydrologic forecast information for customers and partners.

15.2 Issuance Guidelines

15.2.1 Creation Software. Use appropriate COTS word processing software.

15.2.2 Issuance Criteria. Issue the product routinely.

15.2.3 Issuance Time. 2300, 0700, 1100, and 1900 UTC.

15.2.4 Valid Time. 0000-0000 UTC and 1200-1200 UTC. The product expires after valid time.

15.3 Technical Description. The quantitative precipitation forecast discussion should follow the format and content described in this section.

15.3.1 MND Header. Use "QUANTITATIVE PRECIPITATION FORECAST DISCUSSION."

15.3.2 Content. A text message describing the meteorological reasoning used to create the 94Q, 98Q, and 99Q products.

15.3.3 Format. The generic format is as follows:

```
FXUS04 KWBC ddhhmm                                          (WMO Heading)
QPFPFD                                                      (AWIPS ID)

QUANTITATIVE PRECIPITATION FORECAST DISCUSSION              (NWS Product Name)
NWS HYDROMETEOROLOGICAL PREDICTION CENTER CAMP SPRINGS MD   (Issuing Office)
Time am/pm time_zone day mon dd yyyy                        (Issuance time/date)

FINAL DAY 1...DAY 2 AND DAY 3 QPF DISCUSSION
VALID mon dd/hhmm UTC THRU mon dd/hhmm UTC
REFERENCE AWIPS GRAPHICS UNDER...PRECIP ACCUM - 24HR

<Highlight(s) for all days>

DAY 1...

<Discussion for day 1>

DAY 2...

<Discussion for day 2>

DAY 3...

<Discussion for day 3

<forecaster name(s)>
GRAPHICS AVAILABLE ON THE WEB AT www.hpc.ncep.noaa.gov

<QPF vector coordinates>

$$
```

15.4 Updates, Amendments and Corrections. Do not issue updates. Correct for format and grammatical errors as required.

16. 5-Day Quantitative Precipitation Forecast. This product, prepared by the HPC, provides a 5-day QPF total.

16.1 Mission Connection. This product helps the NWS to meet its mission by highlighting areas expected to receive significant cumulative precipitation over the five day forecast horizon,

thus providing information which can be used in near-term flood outlooks such as the Significant River Flood Outlook (see Section 4, above, and NWS Instruction 10-912). In addition, this product is used by the general public, the media and other government agencies for planning purposes.

16.2 Issuance Guidelines.

16.2.1 Creation Software. Use N-AWIPS software to generate this product.

16.2.2 Issuance Criteria. This product is issued on a regular schedule.

16.2.3 Issuance Time. 1815 UTC.

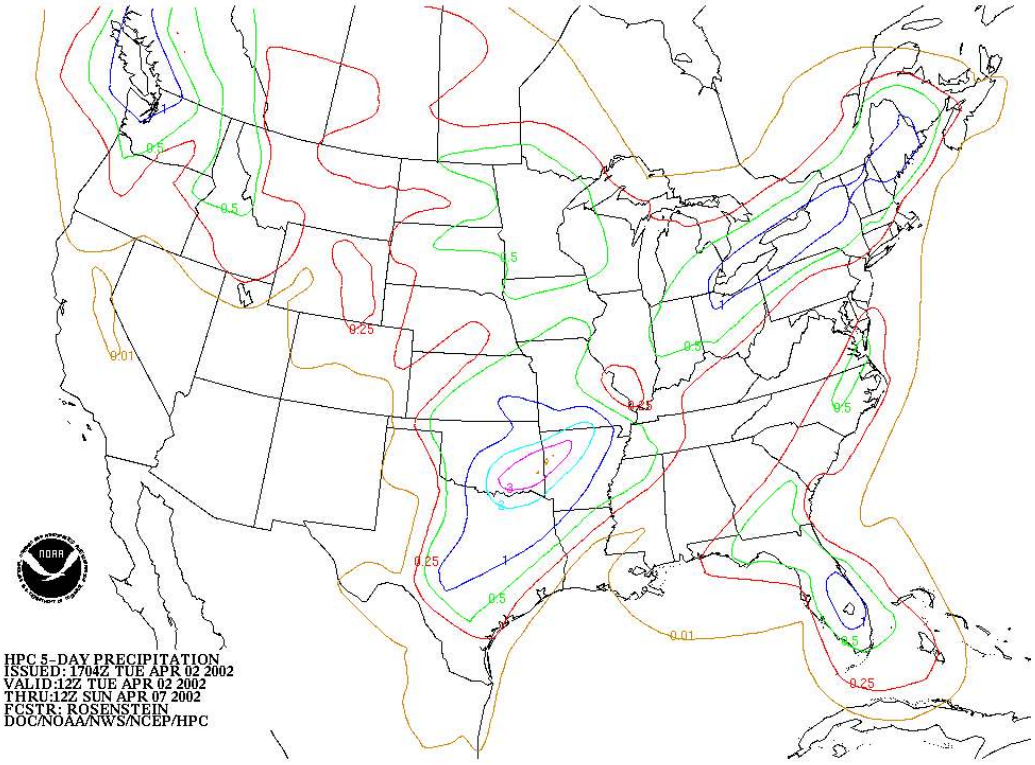
16.2.4 Valid Time. 1200 UTC on the day of issuance to 1200 UTC five days later.

16.3 Technical Description.

16.3.1 Dissemination. Disseminate on AWIPS.

16.3.2 Content. This graphical product depicts the 5-day total precipitation expected. It is produced by a simple arithmetic addition of the 94Q, 98Q, 99Q issued at 1015 UTC, and combined with a 48-hr QPF produced by the HPC medium range forecaster.

16.3.3 Format. Follow the format used in the sample below - a typical 5-day total quantitative precipitation forecast.



16.4 Updates, Amendments, and Corrections. HPC will update this product if conditions warrant. Corrections are sent out as needed.

Appendix A

Hydrometeorological Automated Data System Report (RRS) Product Headers For Individual Weather Forecast Offices and River Forecast Centers

(Reference Section 5)

WFO	WMO Header	AWIPS Header
Aberdeen SD	SXUS42 KWOH	RRS ABR
Albany NY	SRUS38 KWOH	RRS ALY
Albuquerque NM	SRUS75 KWOH	RRS ABQ
Amarillo TX	SRUS76 KWOH	RRS AMA
Anchorage AK	SRAK40 KWOH	RRS AFC
Atlanta GA	SRUS59 KWOH	RRS FFC
Austin/San Antonio TX	SRUS82 KWOH	RRS EWX
Baltimore MD/Washington DC	SRUS47 KWOH	RRS LWX
Billings MT	SXUS58 KWOH	RRS BYZ
Binghamton NY	SRUS37 KWOH	RRS BGM
Birmingham AL	SRUS67 KWOH	RRS BMX
Bismarck ND	SXUS52 KWOH	RRS BIS
Boise ID	SXUS69 KWOH	RRS BOI
Boston MA	SRUS39 KWOH	RRS BOX
Brownsville TX	SRUS85 KWOH	RRS BRO
Buffalo NY	SRUS36 KWOH	RRS BUF
Burlington VT	SRUS35 KWOH	RRS BTV
Caribou ME	SRUS33 KWOH	RRS CAR
Central Illinois IL	SXUS30 KWOH	RRS ILX
Central Pennsylvania PA	SRUS42 KWOH	RRS CTP
Charleston SC	SRUS55 KWOH	RRS CHS
Charleston WV	SRUS46 KWOH	RRS RLX
Cheyenne WY	SXUS54 KWOH	RRS CYS
Chicago IL	SXUS31 KWOH	RRS LOT
Cincinnati OH	SRUS45 KWOH	RRS ILN
Cleveland OH	SRUS44 KWOH	RRS CLE
Columbia SC	SRUS54 KWOH	RRS CAE
Corpus Christi TX	SRUS84 KWOH	RRS CRP
Dallas/Fort Worth TX	SRUS80 KWOH	RRS FWD
Denver CO	SXUS55 KWOH	RRS BOU
Des Moines IA	SXUS40 KWOH	RRS DMX
Detroit MI	SXUS21 KWOH	RRS DTX
Dodge City KS	SXUS47 KWOH	RRS DDC
Duluth MN	SXUS35 KWOH	RRS DLH
Eastern North Dakota ND	SXUS41 KWOH	RRS FGF
El Paso TX	SRUS79 KWOH	RRS EPZ

Elko NV	SXUS68 KWOH	RRS LKN
Eureka CA	SXUS77 KWOH	RRS EKA
Fairbanks AK	SRAK41 KWOH	RRS AFG
Flagstaff AZ	SXUS64 KWOH	RRS FGZ
Glasgow MT	SXUS59 KWOH	RRS GGW
Goodland KS	SXUS48 KWOH	RRS GLD
Grand Junction CO	SXUS57 KWOH	RRS GJT
Grand Rapids MI	SXUS22 KWOH	RRS GRR
Great Falls MT	SXUS60 KWOH	RRS TFX
Green Bay WI	SXUS33 KWOH	RRS GRB
Greenville/Spartanburg SC	SRUS53 KWOH	RRS GSP
Guam PC	SRPA41 KWOH	RRS GUM
Hastings NE	SXUS49 KWOH	RRS GID
Honolulu HI	SRPA40 KWOH	RRS HFO
Houston/Galveston TX	SRUS83 KWOH	RRS HGX
Indianapolis IN	SXUS24 KWOH	RRS IND
Jackson KY	SXUS25 KWOH	RRS JKL
Jackson MS	SRUS68 KWOH	RRS JAN
Jacksonville FL	SRUS60 KWOH	RRS JAX
Juneau AK	SRAK42 KWOH	RRS AJK
Kansas City MO	SXUS39 KWOH	RRS EAX
Key West FL	SRUS63 KWOH	RRS EYW
Knoxville/Tri Cities TN	SRUS56 KWOH	RRS MRX
LaCrosse WI	SXUS37 KWOH	RRS ARX
Lake Charles LA	SRUS69 KWOH	RRS LCH
Las Vegas NV	SXUS67 KWOH	RRS VEF
Little Rock AR	SRUS72 KWOH	RRS LZK
Los Angeles CA	SXUS80 KWOH	RRS LOX
Louisville KY	SXUS26 KWOH	RRS LMK
Lubbock TX	SRUS77 KWOH	RRS LUB
Marquette MI	SXUS34 KWOH	RRS MQT
Medford OR	SXUS74 KWOH	RRS MFR
Melbourne FL	SRUS61 KWOH	RRS MLB
Memphis TN	SRUS58 KWOH	RRS MEG
Miami FL	SRUS62 KWOH	RRS MFL
Midland/Odessa TX	SRUS78 KWOH	RRS MAF
Milwaukee WI	SXUS32 KWOH	RRS MKX
Minneapolis MN	SXUS36 KWOH	RRS MPX
Missoula MT	SXUS61 KWOH	RRS MSO
Mobile AL	SRUS66 KWOH	RRS MOB
Moorehead City NC	SRUS51 KWOH	RRS MHX
Nashville TN	SRUS57 KWOH	RRS OHX
New Orleans/Baton Rouge LA	SRUS70 KWOH	RRS LIX

New York City NY	SRUS40 KWOH	RRS OKX
North Central Lower Michigan MI	SXUS20 KWOH	RRS APX
North Platte NE	SXUS50 KWOH	RRS LBF
Northern Indiana IN	SXUS23 KWOH	RRS IWX
Oklahoma City OK	SRUS74 KWOH	RRS OUN
Omaha NE	SXUS44 KWOH	RRS OAX
Paducah KY	SXUS27 KWOH	RRS PAH
Pendleton OR	SXUS72 KWOH	RRS PDT
Philadelphia PA./Mt Holly NJ	SRUS41 KWOH	RRS PHI
Phoenix AZ	SXUS66 KWOH	RRS PSR
Pittsburgh PA	SRUS43 KWOH	RRS PBZ
Pocatello/Idaho Falls ID	SXUS62 KWOH	RRS PIH
Portland ME	SRUS34 KWOH	RRS GYX
Portland OR	SXUS73 KWOH	RRS PQR
Pueblo CO	SXUS56 KWOH	RRS PUB
Quad Cities IA	SXUS38 KWOH	RRS DVN
Raleigh/Durham NC	SRUS50 KWOH	RRS RAH
Rapid City SD	SXUS51 KWOH	RRS UNR
Reno NV	SXUS75 KWOH	RRS REV
Riverton WY	SXUS53 KWOH	RRS RIW
Roanoke VA	SRUS49 KWOH	RRS RNK
Sacramento CA	SXUS76 KWOH	RRS STO
Salt Lake City UT	SXUS63 KWOH	RRS SLC
San Angelo TX	SRUS81 KWOH	RRS SJT
San Diego CA	SXUS81 KWOH	RRS SGX
San Francisco Bay Area CA	SXUS78 KWOH	RRS MTR
San Joaquin Valley CA	SXUS79 KWOH	RRS HNX
San Juan PR	SRUS86 KWOH	RRS SJU
Seattle/Tacoma WA	SXUS71 KWOH	RRS SEW
Shreveport LA	SRUS71 KWOH	RRS SHV
Sioux Falls SD	SXUS43 KWOH	RRS FSD
Spokane WA	SXUS70 KWOH	RRS OTX
Springfield MO	SXUS28 KWOH	RRS SGF
St. Louis MO	SXUS29 KWOH	RRS LSX
Tallahassee FL	SRUS65 KWOH	RRS TAE
Tampa Bay Area FL	SRUS64 KWOH	RRS TBW
Topeka KS	SXUS45 KWOH	RRS TOP
Tucson AZ	SXUS65 KWOH	RRS TWC
Tulsa OK	SRUS73 KWOH	RRS TSA
Wakefield VA	SRUS48 KWOH	RRS AKQ
Wichita KS	SXUS46 KWOH	RRS ICT
Wilmington NC	SRUS52 KWOH	RRS ILM

Table A-2. RRS product headers, by RFC.

RFC	WMO Header	AWIPS Header
Alaska-Pacific RFC	SRUS32 KWOH	RRS ACR
Arkansas-Red Basin RFC	SRUS26 KWOH	RRS TUA
California-Nevada RFC	SRUS30 KWOH	RRS RSA
Colorado Basin RFC	SRUS29 KWOH	RRS STR
Lower Mississippi RFC	SRUS24 KWOH	RRS ORN
Middle Atlantic RFC	SRUS21 KWOH	RRS RHA
Missouri Basin RFC	SRUS27 KWOH	RRS KRF
North Central RFC	SRUS28 KWOH	RRS MSR
Northeast RFC	SRUS20 KWOH	RRS TAR
Northwest RFC	SRUS31 KWOH	RRS PTR
Ohio RFC	SRUS22 KWOH	RRS STR
Southeast RFC	SRUS23 KWOH	RRS ALR
West Gulf RFC	SRUS25 KWOH	RRS FWR